IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS

Appellants:	Janusz M. Kucharski	**APPEAL BRIEF**
Serial No.	10/056,270	
Filing Date	January 24, 2002	
Group Art Unit	2827	
Examiner	Tuan T. Dinh	
Attorney Docket No.	100.323US01	
Title: ELECTRICAL NOISE PROTECTION		

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1. Introduction

On June 3, 2004, Appellant filed a notice of appeal from the final rejection of claims 1-26 set forth in the Final Office Action mailed March 10, 2004. Three copies of this Appeal Brief are

hereby filed on September 7, 2004 and are accompanied by a fee in the amount of $330.00 as required under 37 C.F.R. §1.17(c).

This paper is also accompanied by a Petition, as well as the appropriate fee, to obtain a 1-month extension of the period for filing the Appeal Brief, thereby moving the deadline for filing the brief from August 7, 2004 to September 7, 2004.

2. Real Party in Interest

The real party in interest in the above-captioned application is the assignee ADC DSL Systems, Inc.

3. Related Appeals and Interferences

There are no other appeals or interferences known to Appellant that will have a bearing on the Board's decision in the present appeal.

4. Status of the Claims

Claims 1-26 are pending in the application.

Claims 1-7, 11-13, 16-18, and 22-24 were elected for examination and are the subject of this appeal.

Claims 8-10, 14, 15, 19-21, 25, and 26 have been withdrawn from consideration.

In the Final Office Action mailed March 10, 2004, claims 1 and 11-13 were finally rejected under 35 U.S.C. §102(b) and claims 2-7, 16-18 and 22-24 were finally rejected under 35 U.S.C. §103(a).

5. Status of Amendments

No amendment has been filed subsequent to the Final Office Action mailed March 10, 2004.

6. Summary of the Invention

Embodiments of the present invention reduce noise that is transmitted by a power loop of a switch-mode power supply to other circuitry within the switch-mode power supply, such as a sensitive control circuit for controlling the switch-mode power supply. This involves locating the power loop and the other circuitry on opposite sides of a circuit board and respectively connecting the power loop and the other circuitry to electrically interconnected ground planes lying in different planes of the circuit board. This reduces the interference transmitted from the power loop to the other circuitry compared to when the other circuitry and the power loop are located on the same side of the circuit board and/or are connected to the same ground plane.

One embodiment of a switch-mode power supply 100 is shown in Figure 1 of the present application and is described at paragraph [0015], page 3, through paragraph [0017], page 4. Switch-mode power supply 100 includes a circuit board 101, shown in cross-section in Figure 1. A power loop 102 is disposed on a side (or layer) 110 of circuit board 101. A control circuit 103 is disposed on a side (or layer) 112 of circuit board 101 opposite to side 110. In the embodiment shown in Figure 1, power loop 102 includes a capacitor 120, an inductor 122, and a switch 124. Disposing power loop 102 and control circuit 103 on opposite sides of circuit board 101 physically separates power loop 102 from control circuit 103. This reduces interference transmitted from power loop 102 to control circuit 103 compared to when power loop 102 and control circuit 103 are located on the same side of a circuit board.

Power loop 102 is connected to a ground plane 104 disposed on a layer 130 that is disposed between sides 110 and 112 of circuit board 101. Control circuit 103 is connected to a ground plane 105 on a layer 132 that is disposed between sides 110 and 112 of circuit board 101 so that ground planes 104 and 105 lie in different planes of circuit board 101 and are physically separated from each other. This reduces the interference transmitted to control circuit 103 compared to when control circuit 103 is connected to the same ground plane as power loop 102. In the embodiment shown in Figure 1, a conductive trace 106 disposed within circuit board 101

interconnects ground planes 104 and 105 and a conductive trace 107 connects ground planes 104 and 105, for example, to chassis ground.

7. Issues Presented for Review

The first issue presented in this Appeal is whether the Examiner erred in rejecting claims 1 and 11-13 under 35 U.S.C. §102(b), as being anticipated by Iwane, (U.S. Patent No. 5,719,750) (referred to here as "Iwane").

The second issue presented in this Appeal is whether the Examine erred in rejecting claims 2-7, 16-18 and 22-24 under 35 USC § 103(a) as being unpatentable over Iwane in view of Hirashiro (JP 406069680A) (referred to here as "Hirashiro").

8. Grouping of Claims

Each of claims 1-7, 11-13, 16-18, and 22-24 stands or falls on its own merits for reasons detailed below. Each of the claims is patentably distinct for the reasons detailed below.

9. Arguments

A. Rejections of claims 1 and 11-13 under 35 U.S.C. §102 (b)

1. The Applicable Law

35 U.S.C. §102(b) provides in relevant part:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

A claim is anticipated under 35 U.S.C.§ 102 only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference. *Verdegaal Bros. v. Union Oil Co. of California,* 814 F.2d 628, 631, 2 U.S.P.Q.2d 1051, 1053 (Fed. Cir. 1987). "The identical invention must be shown in as complete detail as is contained in the . . . claim." *Richardson v. Suzuki Motor Co.,* 868 F.2d 1226, 1236, 9 U.S.P.Q.2d 1913, 1920

(Fed. Cir. 1989). The elements must be arranged as required by the claim, but identical terminology is not required. *In re Bond*, 910 F. 2d 831, 15 U.S.P.Q.2d 1566 (Fed. Cir. 1990).

Anticipation focuses on whether a claim reads on a product or process disclosed in a prior art reference, not on what the reference broadly teaches. *Kalman v. Kimberyl-Clark Corp.*, 713 F.2d 760, 218 U.S.P.Q. 781 (Fed. Cir. 1983). To anticipate a claim, a reference must disclose every element of the challenged claim and enable one skilled in the art to make the anticipating subject matter. *PPG Industries, Inc. v. Guardian Industries Corp.*, 75 F.3d 1558, 37 U.S.P.Q.2d 1618 (Fed. Cir. 1996).

2. 35 U.S.C. § 102(b) rejection analysis

The Examiner has taken the position that components 6a-6c of Iwane are "a first circuit disposed on a first side of the circuit board, the first circuit connected to a first ground plane of the circuit board" as recited in claim 1 of the present application. The Examiner also took the position that components 6d-6e of Iwane are "a second circuit disposed on a second side of the circuit board, wherein the second side is opposite the first side, the second circuit connected to a second ground plane of the circuit board" as recited in claim 1 of the present application.

It is respectfully submitted that there is no factual basis for the conclusion that components 6a-6c of Iwane are a "a first circuit disposed on a first side of the circuit board, the first circuit connected to a first ground plane of the circuit board" or for the conclusion that components 6d-6e of Iwane are "a second circuit disposed on a second side of the circuit board, wherein the second side is opposite the first side, the second circuit connected to a second ground plane of the circuit board." Such conclusions are inconsistent with what is described in Iwane. For example, Iwane states, in reference to a first embodiment shown in FIG. 2, that:

> A high frequency circuit comprising the electronic components 6a, 6d is connected to the ground layer 3a and a digital circuit comprising the electronic components 6c, 6e is connected to the ground layer 3b.

Iwane, column 3, lines 64-67. In other words, contrary to what is asserted in by the Examiner, components 6a-6c are not part of the same circuit nor are components 6d-6e part of the same

circuit. Thus, components 6a-6c are not a "a first circuit disposed on a first side of the circuit board, the first circuit connected to a first ground plane of the circuit board" nor are components 6d-6e "a second circuit disposed on a second side of the circuit board, wherein the second side is opposite the first side, the second circuit connected to a second ground plane of the circuit board."

In responding to this argument, the Examiner characterized Applicant's position as arguing that "Iwane does not disclose components 6a-6e, respectively as first and second circuits." *See* Final Office Action, paragraph 5. The Examiner then reasoned that "Iwane discloses the components (6a-6e) being represent to be of [sic] a frequency synthesizer (108), a transmitter RF pre-amplifier (110), and a transmitter RF power amplifier (109), see column 8, lines 21-25, respectively. Those components include circuits for input/output signals generated inside the components. Therefore, it is believed that the 102(b) rejection as set forth claim 1 [sic] is proper." *See* Final Office Action, paragraph 5.

The Examiner's response fails to address the thrust of Applicant's argument. The Examiner has failed to provide any explanation as to how Iwane supports the conclusion that components 6a-6c of Iwane are "a first circuit disposed on a first side of the circuit board, the first circuit connected to a first ground plane of the circuit board" or the conclusion that components 6d-6e of Iwane are "a second circuit disposed on a second side of the circuit board, wherein the second side is opposite the first side, the second circuit connected to a second ground plane of the circuit board." As noted above, components 6a-6c are not part of the same circuit nor are components 6d-6e part of the same circuit.

Accordingly, the Examiner has failed to make out a *prima facie* showing of anticipation under 35 U.S.C. §102(b).

Claims 11-13 depend from claim 1 and, therefore, the arguments set forth above with respect to claim 1 apply to claims 11-13 as well.

B. Rejection of claims 2-7, 16-18 and 22-24 under 35 U.S.C. §103(a)

1. Applicable Law

35 U.S.C.§ 103 provides in relevant part:

Conditions for patentability; non-obvious subject matter.

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

To establish a case of *prima facie* obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art and not based in the applicant's disclosure. *In re vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir 1991). MPEP § 2143 - § 2143.03.

The mere fact that references can be combined or modified does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination. MPEP Section 2143.01 *citing In re Mills,* 916 F.2d 680, 16 USPQ2d 1430 (Fed. Cir. 1990) (Claims were directed to an apparatus for producing an aerated cementitious composition by drawing air into the cementitious composition by driving the output pump at a capacity greater than the feed rate. The prior art reference taught that the feed means can be run at a variable speed, however the court found that this does not require that the output pump be run at the claimed speed so that air is drawn into the mixing chamber and is entrained in the ingredients during operation. Although a prior art device "may be capable of being modified to run the way the apparatus is

claimed, there must be a suggestion or motivation in the reference to do so." 916 F.2d at 682, 16 USPQ2d at 1432.).

2. 35 U.S.C. § 103(a) Rejection Analysis

In rejecting claims 2-4, the Examiner took the position that Iwane discloses all of the limitations of the claimed invention except for the first circuit having a switching mode power supply as recited in the rejected claims. The Examiner then asserted that Hirashiro shows an inverter module having a power circuit that comprises a capacitor and an inductor that is capable of being either a forward or flyback type switch mode power supply. The Examiner then reasoned that it would have been obvious to one of ordinary skill in the art at the time the invention was made to utilize a first circuit having a switch mode power supply as taught by Hirashiro in the printed circuit board of Iwane in order to provide a switching circuit and power for a circuit board. *See* Final Office Action, paragraph 4.

Claims 2-4 ultimately depend from claim 1. Therefore, the same arguments set forth above with respect to claim 1 apply to claims 2-4 as well.

Moreover, the Examiner has failed to provide any motivation for the combination proposed by the Examiner. To make out a *prima facie* case of obviousness under Section 103, among other things, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. As noted above, the mere fact that references can be combined or modified does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination.

Even assuming (for the sake of argument) that the printed circuit board of Iwane could be modified to include the alleged switch mode power supply of Hirashiro, the Examiner has failed to provide any suggestion or motivation to make the proposed modification. That is, the Examiner has not provided an explanation as to why one of ordinary skill in the art would be motivated to include the alleged switching mode power supply of Hirashiro in the printed circuit board of Iwane. The Examiner stated that "It would have been obvious to one having ordinary

skill in the art at the time the invention was made to utilize a first circuit having a switch mode power supply (forward/flyback type switch mode power supply) as taught by [Hirashiro], employed in the printed circuit board of Iwane in order to provide a switching circuit and operate a power [sic] for a circuit board." *See* Final Office Action, paragraph 4. In other words, the Examiner's position is that one of ordinary skill in the art would have made the proposed combination in order to make the proposed combination. This reasoning is circular and fails to provide the suggestion or motivation required to make a showing of obviousness under Section 103.

In responding to this argument, the Examiner asserted that Hirashiro does not limit the applications for the subject matter taught therein and therefore could be used as proposed by the Examiner. *See* Final Office Action, paragraph 5. Even assuming that these assertions are correct, the mere fact that references can be combined or modified does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination. No such showing has been made regarding the desirability of the proposed combination.

Accordingly, the Examiner has failed to make a *prima facie* case that claims 2-4 are obviousness under Section 103.

In rejecting claims 5-6 of the present application, the Examiner took the position that Hirashiro shows a second circuit that controls a first circuit and that the first circuit is adapted to power the second circuit. The Examiner reasoned that it would have been obvious to one of ordinary skill in the art at the time the invention was made to have a second circuit control a first circuit and the first circuit adapted to power the second circuit as taught by JP in the printed circuit board of Iwane in order to provide control and power circuits for a circuit board.

Claims 5-6 ultimately depend from claim 1. Therefore, the same arguments set forth above with respect to claim 1 apply to claims 5-6 as well.

Moreover, the Office Action fails to make out a *prima facie* case of obviousness under Section 103. The Examiner took the position that one of ordinary skill in the art would have been motivated to include the alleged power and control circuits of Hirashiro in the printed

circuit board of Iwane in order to provide power and control circuits in the printed circuit board of Iwane. It is respectfully submitted that this reasoning is circular and fails to provide any motivation for why one of ordinary skill in the art would actually want to include the alleged power and control circuits of Hirashiro in the printed circuit board of Iwane. Again, as noted above, even if (for the sake of argument) the Iwane and Hirashiro references can be combined or modified, that would not render the resultant combination obvious unless the prior art also suggests the desirability of the combination. The Examiner has failed to show how the cited references suggest the desirability of the proposed combination.

Accordingly, the Examiner has failed to make a *prima facie* case that claims 5-6 are obviousness under Section 103.

In rejecting claims 7 and 18 of the present application, the Examiner took the position that Iwane and Hirashiro do not show that a second circuit operates at current levels substantially lower than a first circuit. The Examiner reasoned that it would have been obvious to one of ordinary skill in the art at the time the invention was made to have a second circuit operate at current levels substantially lower than the first circuit in order to control power applied on the printed circuit as taught by Iwane and Hirashiro.

Claim 7 ultimately depends from claim 1. Therefore, the same arguments set forth above with respect to claim 1 apply to claim 7 as well.

Claim 18 depends from independent claim 16. Claim 16 recites in relevant part "a power loop disposed on a first side of the circuit board, the power loop connected to a first ground plane of the circuit board" and "a control circuit disposed on a second side of the circuit board, the second side opposite the first side, the control circuit connected to a second ground plane of the circuit board, wherein the control circuit is adapted to control the power loop." For at least the same reasons set forth above with respect to claim 1, Iwane fails to disclose these features of claim 16 and therefore claim 18.

Moreover, the Examiner has failed to make out a *prima facie* case of obviousness under Section 103. The Examiner conceded that neither Iwane or Hirashiro show the additional

features recited in dependent claims 7 and 18 of the present application. However, the Examiner failed to provide any reasoning or evidence as to why one of ordinary skill in the art would have been motivated to make the proposed modification. It is respectfully submitted that the Examiner is using impermissible hindsight in making the proposed modification.

In responding to this argument, the Examiner asserted that the power circuit of Hirashiro is *capable* of being operated at current levels substantially lower than another component mounted on the circuit board. *See* Final Office Action, paragraph 5. Again, even assuming these assertions are correct, the mere fact that references can be combined or modified does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination. The Examiner has failed to make such a showing.

Accordingly, the Examiner has failed to make a *prima facie* case that claims 7 and 18 are obviousness under Section 103.

In rejecting claims 16-17, the Examiner took the position that Iwane discloses all of the features recited in the rejected claims except for a power loop and a control circuit disposed on first and second surfaces of the printed circuit board and that the power loop is adapted to power the control circuit. The Examiner further reasoned that it would have been obvious to one of ordinary skill in the art at the time the invention was made to have a power loop and a control circuit disposed on first and second surfaces of the printed circuit board as taught by Hirashiro employed in the printed circuit board of Iwane for the purpose of providing power and control input/output signals for the printed circuit board.

As noted above, claim 16 recites in relevant part "a power loop disposed on a first side of the circuit board, the power loop connected to a first ground plane of the circuit board" and "a control circuit disposed on a second side of the circuit board, the second side opposite the first side, the control circuit connected to a second ground plane of the circuit board, wherein the control circuit is adapted to control the power loop." For at least the same reasons set forth above with respect to claim 1, Iwane fails to disclose these features of claim 16.

Moreover, the Examiner failed to make out a *prima facie* case of obviousness under

Section 103. The Examiner failed to provide any reasoning or evidence as to why one of ordinary skill in the art would have been motivated to make the proposed modification. It is respectfully submitted that the Examiner is using impermissible hindsight in making the proposed combination.

Accordingly, the Examiner has failed to make a *prima facie* case that claims 16-17 are obviousness under Section 103.

Claims 22-24 all ultimately depend from claim 16. Therefore, the arguments set forth above with respect to claim 16 apply to these claims as well. Accordingly, the Examiner has failed to make a *prima facie* case that claims 22-24 are obviousness under Section 103.

10. Summary

Appellant has set forth reasons why the Examiner is incorrect in maintaining the rejections of the pending claims. Specifically, the Examiner has failed to set forth a *prima facie* case of anticipation or obviousness. Iwane and Hirashiro either alone or in combination do not teach all of the features recited in the pending independent and dependant claims. Appellant respectfully submits that, for the above reasons, claims 1-7, 11-13, 16-18, and 22-24 are allowable over the cited art. Therefore, reversal of the Examiner's rejections is respectfully requested.

Respectfully submitted,

Date: 9/7/2004

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Appendix 1

The Claims on Appeal

1. An electronic device comprising:

a circuit board;

a first circuit disposed on a first side of the circuit board, the first circuit connected to a first ground plane of the circuit board;

a second circuit disposed on a second side of the circuit board, wherein the second side is opposite the first side, the second circuit connected to a second ground plane of the circuit board; and

wherein the first and second ground planes respectively lie in different planes of the circuit board and are electrically interconnected by a conductive trace disposed within the circuit board.

2. The electronic device of claim 1, wherein the first circuit is a switch-mode power supply.

3. The electronic device of claim 2, wherein the switch-mode power supply is a forward-type switch mode power supply.

4. The electronic device of claim 2, wherein the switch-mode power supply is a flyback-type switch mode power supply.

5. The electronic device of claim 1, wherein the second circuit controls the first circuit.

6. The electronic device of claim 1, wherein the first circuit is adapted to power the second circuit.

7. The electronic device of claim 1, wherein the second circuit operates at current levels substantially lower than the first circuit.

8. (Withdrawn)

9. (Withdrawn)

10. (Withdrawn)

11. The electronic device of claim 1, wherein the circuit board comprises two or more layers disposed between the first and second sides.

12. The electronic device of claim 11, wherein the first ground plane is disposed on one of the two or more layers and the second ground plane is disposed on another of the two or more layers.

13. The electronic device of claim 1, wherein the circuit board comprises one or more layers disposed between the first and second sides.

14. (Withdrawn)

15. (Withdrawn)

16. A switch-mode power supply comprising:

a circuit board;

a power loop disposed on a first side of the circuit board, the power loop connected to a first ground plane of the circuit board;

a control circuit disposed on a second side of the circuit board, the second side opposite the first side, the control circuit connected to a second ground plane of the circuit board, wherein the control circuit is adapted to control the power loop; and

wherein the first and second ground planes respectively lie in different planes of the circuit board and are electrically interconnected by a conductive trace disposed within the circuit board.

17. The switch-mode power supply of claim 16, wherein the power loop is adapted to power the control circuit.

18. The switch-mode power supply of claim 16, wherein the control circuit operates at current levels substantially lower than the power loop.

19. (Withdrawn)

20. (Withdrawn)

21. (Withdrawn)

22. The switch-mode power supply of claim 16, wherein the circuit board comprises two or more layers disposed between the first and second sides.

23. The switch-mode power supply of claim 22, wherein the first ground plane is disposed on one of the two or more layers and the second ground plane is disposed on another of the two or more layers.

24. The switch-mode power supply of claim 16, wherein the circuit board comprises one or more layers disposed between the first and second sides.

25. (Withdrawn)

26. (Withdrawn)